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(71) Applicant(s)

Microsurgical Equipment Limited

(Incorporated in the United Kingdom)

51 Collingdon Street, LUTON, Bedfordshire, LU1 1RT,
United Kingdom

(72) Inventor(s)

Nicholas Richard Kemp

(74) Agent and/or Address for Service

N Kemp

Microsurgical Equipment Limited, 51 Collingdon
Street, LUTON, Bedfordshire, LU1 1RT,
United Kingdom

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(56) Documents Cited

GB 2255926 A US 5146685 A US 4651735 A

US 3802077 A

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INT CL⁶ A61B 17/32 , B26B 3/00 5/00

(54) Blade holder

(57) A blade holder 4 for a surgical blade 2 has a pair of arms 8A and 6A pivotally interconnected by a pivot 10 and each terminating in a finger 8B and 6B. One finger 8B has a pair of locating pins (12 and 14, fig 3) for locating a slotted blade 2 on its surface.

By closing the two fingers in a pliers-like action, the blade 2 becomes trapped between the two fingers 8B and 6B. A clip acts on the two arms adjacent to their proximal ends so that when closed the blade remains trapped between the two fingers 8B and 6B.

The facing surfaces of the two fingers are so profiled (fig 5) that when held closed by the clip they cause the fingers 8B and 6B to bend out of their plane so as to secure a better gripping action on the blade.

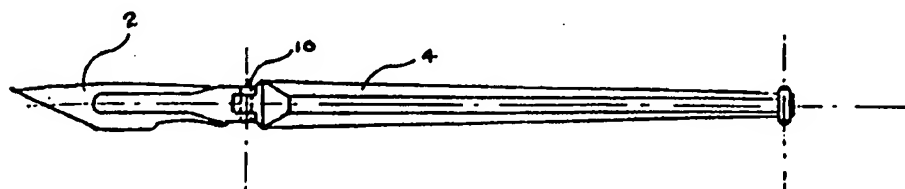
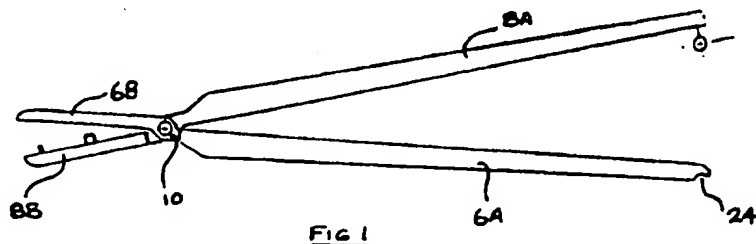
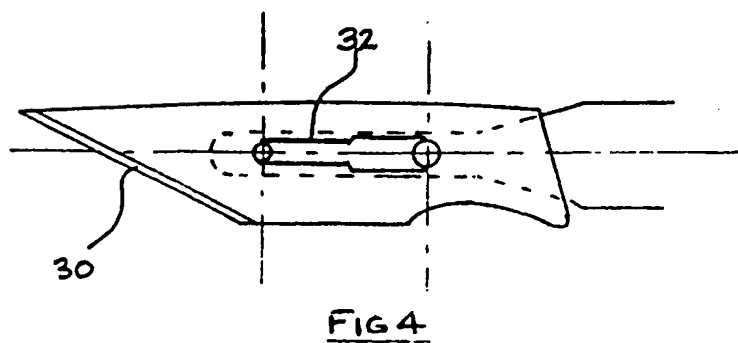
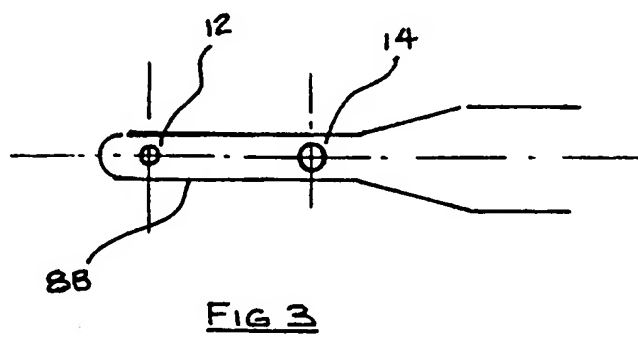
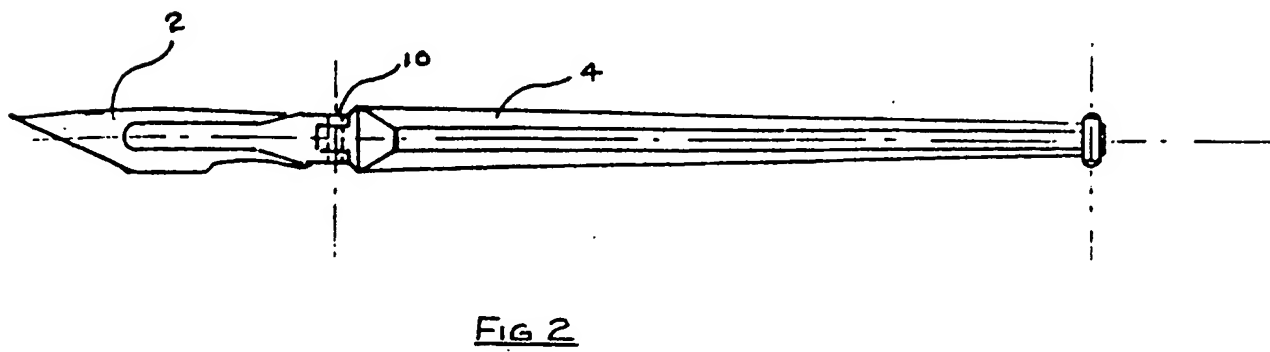
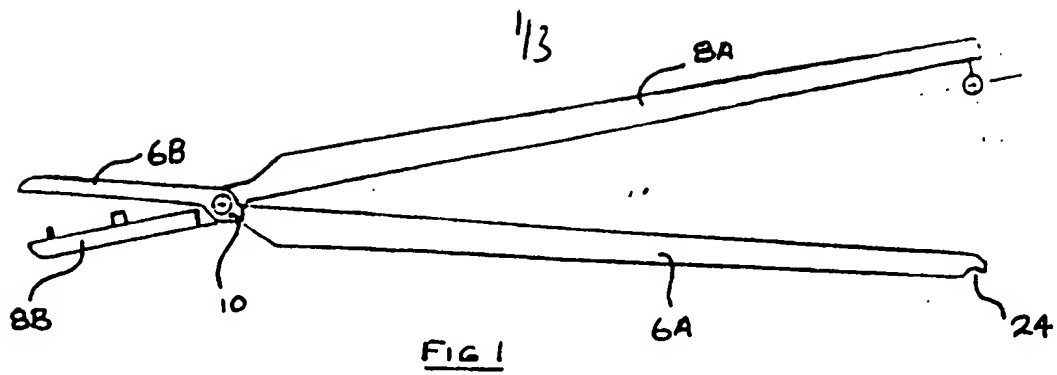


FIG 2

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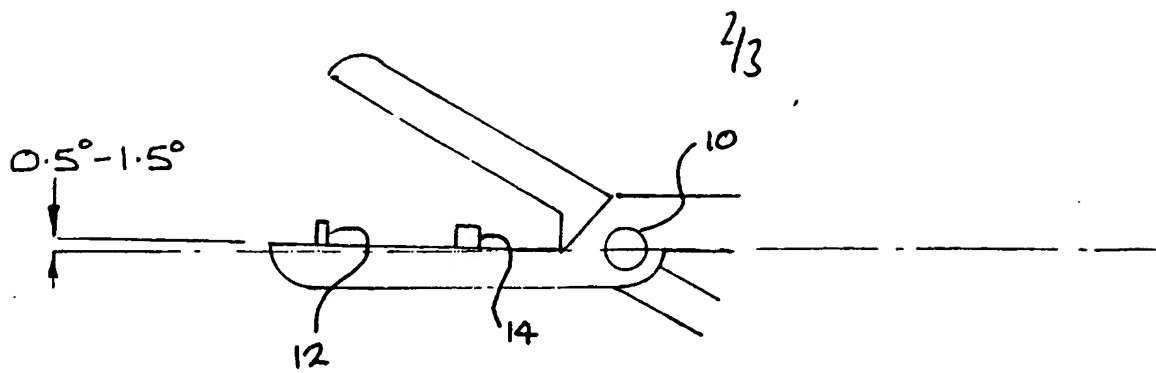


FIG 5

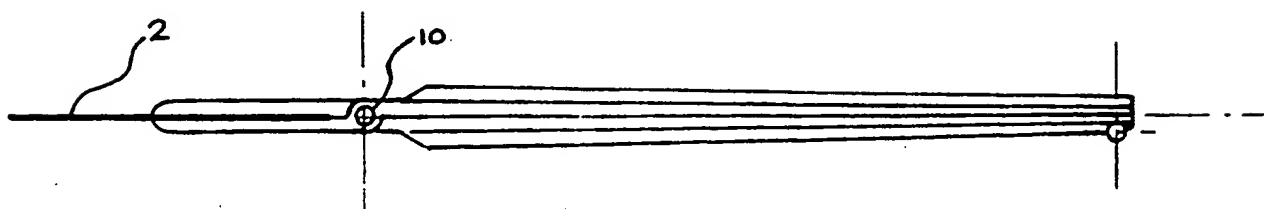


FIG 6

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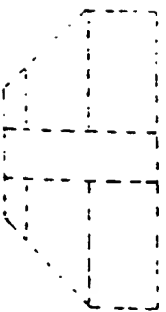
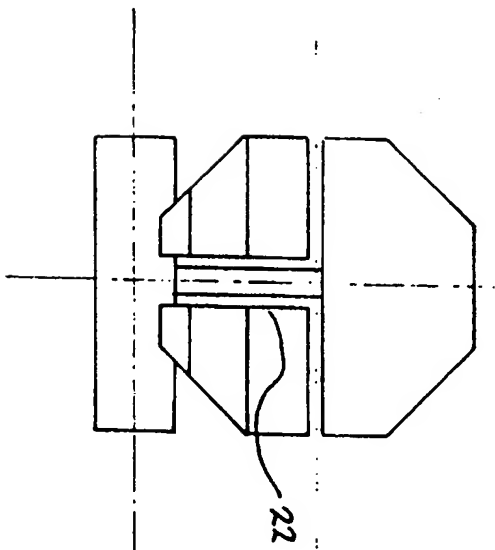
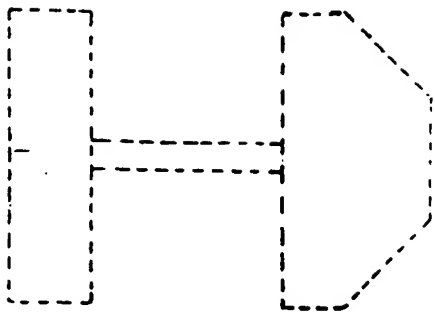
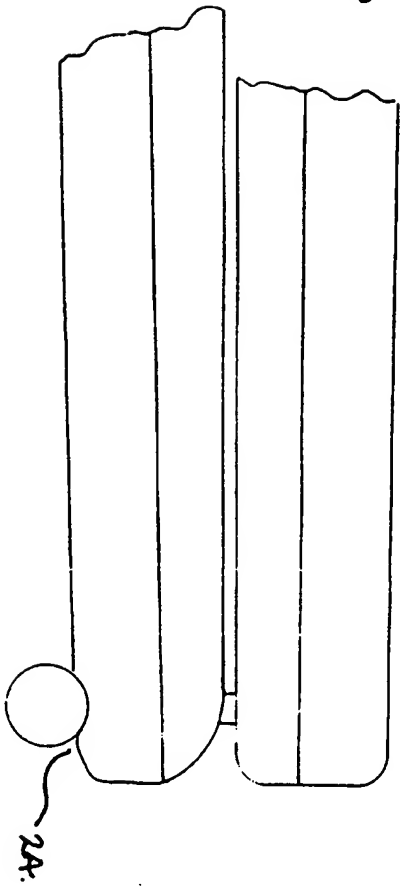


Fig 7

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BLADE HOLDERS

The present invention relates to blade holders.

5 Cutting tools such as scalpels used for surgery and knives used by artists, model makers and engineers often comprise a holder into which replaceable blades can be mounted.

10 In the case of a scalpel, the holder comprises a head portion projecting from the end of a handle portion. The head portion is in the form of an elongate rib having guide grooves in opposite flanks. The scalpel blade has a central slot of enlarged width at one end which is stepped down to a narrower width at the other end. In operation, the wider portion of the slot is fitted over the rib and the blade is slid towards the handle to cause the sides of the narrower portion of the slot to engage the guide grooves. In order to slide the sides of the narrower portion fully home into the grooves, the blade must be bowed out of its plane, since the 15 blade beyond the wider portion of the slot must pass over the top of the rib while the narrower part of the slot is constrained in a plane located below the top of the rib. Force therefore has to be used to bend the blade (which is naturally resilient) and to overcome the friction needed to slide the blade along the grooves.

20 Once the narrower sides of the blade slot have been pushed fully home into the grooves, the end of the blade beyond the wider portion of the slot can drop into a recess in the surface of the rib. The bottom of the recess lies in a plane intermediate the plane containing the top of the rib and the plane of the grooves. The blade is thus held bent slightly out of its plane under its own resilience. This 25 bending of the blade ensures that it is rigidly held by the blade holder. To release the blade, the blade must be lifted out of the recess and pushed back along the grooves. Again, a certain amount of force is necessary.

30 The force needed to load or unload a blade by hand is hazardous and there is a high risk of the surgeon cutting himself on the cutting edge of the blade. The hazard is magnified in surgery since contamination of the cut by the AIDS virus and other dangerous organisms and substances becomes possible. Tools can be used to load and unload blades but this involves extra expense and equipment, and 35 adds to the complexity of the operation of loading and unloading blades.

It is an object of the present invention to provide an improved blade holder.

According to the invention there is provided a blade holder comprising a pair of arms each terminating in a finger, the arms
 5 being pivotally interconnected such that the fingers and arms are superimposed one upon the other, the facing surfaces of the finger portions when superimposed being sufficiently spaced to accommodate a slotted planar blade of predetermined thickness, locating means are provided on the facing surface of one said end portion for engaging the
 10 slotted blade in a predetermined position on the said surface. A gripping action on the blade is induced by a predetermined taper generated between the said fingers.

As said fingers move from an opening position to a superimposed position, one said finger is caused to bend away from the
 15 other finger thereby in the act of bending providing positive pressure against the blade and for this reason giving increased grip to the blade

A locking means is provided to hold the end portions of the arms, when superimposed with a blade engaged by the locating means, firmly in position.

20 A surgical blade holder embodying the present invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a side views of the blade holder open ready to receive a blade;

25 Figure 2 is a plan view of the blade holder closed with the blade located therein;

Figure 3 is a plan view of the lower arm of the blade holder;

Figure 4 is a plan view of the lower arm of the blade holder with a blade resting there upon;

30 Figure 5 is a side view of the lower arm of Figure 3;

Figure 6 is a side elevation of the blade holder closed with blade in position;

Figure 7 is a enlarged view of locking mechanism;

35 Figure 2 shows a surgical scalpel comprising a surgical blade 2 and a blade holder 4. The blade holder 4, as shown more clearly in

Figure 1, comprises two very similar arms, pivotally interconnected by a pivot pin.

The two arms have a generally similar profile and can be moved between a closed position in which the two arms lie on top of the other and an open position in which the two arms are angularly displaced from each other in the manner of a needle holder.

Each arm has an elongate handle portion contoured to provide a comfortable grip on one side of the pivot 10 and a slender finger portion 6B and 8B on the other side of the pivot 10.

Such a contoured handle portion may be round, hexagonal or octagonal in section

The surface of the finger 6B which faces the finger 8B (when the two fingers are superimposed) is tapered, while the facing surface of finger 8B is also tapered. Upstanding from the tapered surface of finger 8B are a locating means typically two posts - a small diameter post 12 and a large diameter post 14. The tapered surface can be more clearly seen in Figure 5. As shown when moving in a direction away from the pivot 10 towards the end of the finger 8B and 6B there is a taper, the surfaces slopes towards one another at an angle of at least 0.5° and preferably 1.5° . The surface of finger 6B is provided with two cavities that are positioned in such a manner that when the two fingers are superimposed, there is an alignment between the cavities in 6B and the pins on 8B such that the pins may enter the cavities.

A suitable locking mechanism may be provided at the end of the handle portions. The end of the handle portion 6A which faces the handle portion 8A is slotted to provide access via the slot to a catch located opposite on the end of arm 8A allowing it to engage in the groove 22 of the handle portion 6A. Closing the blade holder will cause the sprung portion to enter the slot and lock the handle in the closed position, securing the blade.

In operation, with the two arms 6 and 8 opened, as shown in Figure 1, a surgical blade 2 is placed on the surface of the finger 8B (see Figure 4). As shown in Figure 4, the blade has a cutting edge 30 and a central slot 32. The slot 32 is narrower towards the cutting edge 30 and wider at the opposite end. The width of the slot at the narrow end just

exceeds the diameter of the small diameter post 12 and the width of the slot at the wider end just exceeds the diameter of the large diameter post 14. Thus when the blade is placed on the tapered portion of the finger 8B, it is loosely held in place. The height of the posts 14 and 12 is greater than the thickness of the blade 2 when the two arms 6 and 8 are closed with the blade in position shown in Figure 6. During the last stage of closure, the projection of the lock engages through the groove 22 into the recess 24. The dimensions of the recess 24 are such that as the handle portions are moved together, they induce a bending moment in arm 8 which flexes toward arm 6, causing the fingers 8B and 6B to bend and allow the lock to be engaged.

This action firmly holds the blade between the fingers 6B and 8B so that the surgeon can incise without fear of the blade shifting relative to the fingers. To increase friction, the facing surfaces of the fingers may be roughened or treated with a hard material such as tungsten carbide. This rough material, such as tungsten carbide, serves both to improve the grip on the blade, is wear resistant and resists relative movement between the arms of the blade holder when they are closed.

In the blade holder of Figure 1 the blade is positioned by posts 14 and 12. These may be replaced by a solid section so machined to conform to the shapes of the cut away portion of the blade. This location portion may be used in place of the posts and may be fitted into one finger or alternatively can be machined from one finger, or the location portion may be sufficiently high to enter a recess in one finger.

The knife holder can be made of plastic, stainless steel, titanium, brass or aluminium.

It will be appreciated that the profile of the facing surfaces of the fingers, in conjunction with the action of the handle portion and the movement of the lock causes the blade to bear heavily against its contacting surface. This increases the grip on the blade.

CLAIMS

1. A blade holder comprising a pair of arms each terminating in a finger, the arms being pivotally interconnected so that the fingers can be angularly displaced from a position in
5 which the end portions thereof are laterally spaced, to a position on which they are superimposed one upon the other, the facing surfaces of the end portions when superimposed being sufficiently spaced to accommodate a slotted planar blade of predetermined thickness, locating means on the facing surface of one said end portion for engaging the
10 slotted blade to locate the blade in a predetermined position on said surface, and locking means associated with the arms on a side of the pivotal point remote from said fingers, cause said arms to separate in a direction on axis to the direction in which they are angularly moved, as said fingers move from a spaced position to a superimposed position, to
15 thereby cause one said finger to bend towards the other finger to grip the blade.
2. A holder according to Claim 1, wherein at least one region of one of the two facing surfaces being profiled differently from the remainder of the surface, so that when one said finger is bent towards the
20 other finger it urges said blade against said differently profiled region to cause said blade to flex out of its plane to increase the hold on the blade.
3. A holder according to Claim 1 or to Claim 2, wherein said locating means comprises a pair of spaced posts upstanding from the facing surface of said one end portion.
- 25 4. A holder according to Claim 2 or any one of Claim 3 as dependent upon Claim 2, wherein said profiled region is inclined by at least $1/2^{\circ}$ with respect to the remainder of the surface.
5. A holder according to Claim 2 or to Claim 3, wherein said profiled region is inclined by at least $1 1/2^{\circ}$ with respect to the
30 remainder of said surface.
6. A holder according to any preceding claim, wherein the said facing surfaces are roughened to increase friction.
7. A holder according to any one of Claims 1 to 5, wherein said facing surfaces are coated with a material having a
35 high frictional resistance.

8. A blade holder substantially as hereinbefore described with reference to the accompanying drawings.



Application No: GB 9425551.0
Claims searched: 1-7

Examiner: Hal Young
Date of search: 19 March 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B4B ; B4K (KJU)

Int Cl (Ed.6): A61B (17/32) ; B26B (3/00 ; 5/00)

Other: ONLINE : WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB2255926 A (MICRA) see figs 1-6.	1,3
X	US5146685 (BECTON) see figs 1,4,6,7.	1
X	US4651735 (OBEX) see figs 1-5,9-11.	1-5
X	US3802077 (AVERITT) see figs 1-6.	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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